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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/911,038   | 07/23/2001  | Eiji Oki             | Poly-22-2/APP       | 3721             |
| 26479  | 7590        | 08/10/2005           | EXAMINER            |                  |
| STRAUB & POKOTYLO<br>620 TINTON AVENUE<br>BLDG. B, 2ND FLOOR<br>TINTON FALLS, NJ 07724 |             |                      | HAILE, FEBEN        |                  |
|  |             | ART UNIT             | PAPER NUMBER        |                  |
|  |             | 2663                 |                     |                  |

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                 |              |
|------------------------------|-----------------|--------------|
| <b>Office Action Summary</b> | Application No. | Applicant(s) |
|                              | 09/911,038      | OKI ET AL.   |
| Examiner                     | Art Unit        |              |
| Feben M. Haile               | 2663            |              |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 23 July 2001.  
 2a) This action is FINAL.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-34 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-5, 7-10, 13-31, 33 and 34 is/are rejected.  
 7) Claim(s) 6, 11-12, and 32 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on July 23, 2001 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>August 20, 2001</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1-5, 7-10, 13-31, 33-34 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,7-8, 11-14, and 16-23 of Published Application US 2002/0110135, hereinafter referred to as Oki et al. in view of claims 1-2, 4-6, 8-9, 16-17, 19-24, and 26-27 of copending Published Application US 2002/0061028, hereinafter referred to as Chao et al.

**Regarding claim 1**, Oki et al. discloses a plurality of central modules, each having outgoing links, and a second number of input modules, each including k groups of n virtual output queues and outgoing links coupled with each of the plurality of central modules, and a third number of sub-schedulers, each of the third number of sub-schedulers being able to arbitrate matching an input port with an outgoing link of one of the plurality of central modules via an outgoing link of the input module including the input port, a method for scheduling the dispatch of cells stored in the virtual output

queues, the method comprising for each of the sub-schedulers, performing a matching operation, if it has been reserved, to match a cell buffered at a virtual output queue with an outgoing link of one of the plurality of central modules, wherein the matching operation includes; matching the outgoing link with an outgoing link of one of the plurality of central modules, wherein each of the sub-schedulers requires more than one cell time slot to generate a match from its matching operation, and generate wherein the sub-schedulers can collectively a match result in each cell time slot (**claim 1**).

Chao et al. discloses a first number,  $k \times n$ , of output ports, and matching a non-empty virtual output queue of an input module with an outgoing link in the input module, wherein the outgoing link has an associated master arbitration operation for selecting one of the  $k$  groups of  $n$  virtual output queues (**claim 1**).

**Regarding claim 2**, Chao et al. discloses sending, on behalf of each non-empty virtual output queue, a request to slave arbiters, each of the slave arbiters being associated with one of each of the outgoing links of the input module, and each of the slave arbiters being associated with the group of virtual output queues to which the non-empty virtual output queue belongs; sending, on behalf of each group of virtual output queues to which a non-empty virtual output queue belongs, a request master arbiters, each of the master arbiters being associated with one of each of the outgoing links of the input module; selecting, with each of the master arbiters, a virtual output queue group having at least one non-empty virtual output queue, from among one or more virtual output queue groups that sent a request; selecting, with each the slave arbiters, a non-empty virtual output queue, belonging to associated group, from among one or

more virtual output queues that sent a request; and selecting, with the arbiter of the each of selected non-empty virtual output queues each the selected virtual output queue groups, an outgoing link from among the one or more candidate outgoing links, each of the one or more candidate outgoing links being associated with a master arbiter that selected the virtual output queue group and a slave arbiter that selected the non-empty virtual output queue (**claim 2**).

Regarding claim 3, Chao et al. discloses wherein an act of selecting, with a master arbiter, a virtual output queue group having at least one non-empty virtual output queue, is done in accordance with a round robin discipline (**claim 4**).

Regarding claim 4, Chao et al. discloses wherein an act of selecting, with a slave arbiter, a non-empty virtual output queue, belonging to its associated group, is done in accordance with a round robin discipline (**claim 5**).

Regarding claim 5, Chao et al. discloses wherein the act of selecting, with the arbiter of the each of the selected non-empty virtual output queues of each of the selected virtual output queue groups, an outgoing link from among the one or more candidate outgoing links, is done in accordance with a round robin discipline (**claim 6**).

Regarding claim 7, Chao et al. discloses wherein the act of matching the outgoing link of the input module with an outgoing link of one of the central modules includes: sending a request for the outgoing link of the input module to an arbiter for each of the outgoing links of the central modules that leads towards an output port associated with the virtual output queue matched with the outgoing link of the input module; and selecting with the arbiter of each of the outgoing links of the central

modules, an outgoing link of an input module from among those that sent a request (**claim 8**).

Regarding claim 8, Chao et al. discloses wherein the act of selecting with the arbiter of each of the outgoing links of the central module, an outgoing link of the input module that broadcast a request, is done based on a round robin discipline (**claim 9**).

Regarding claim 9, Oki et al. discloses cell buffered at a virtual output queue has been successfully matched with its corresponding output port, informing the virtual output queue (**claim 7**).

Regarding claim 10, Oki et al. discloses for each of the virtual output queues, the virtual output queue has been informed that it has been successfully matched with its corresponding output port, then dispatching its head of line cell (**claim 8**).

Regarding claim 13, Oki et al. discloses for each of the sub-schedulers, maintaining a second queues, for indicating whether the sub-scheduler is available or reserved, wherein the second indicator, for each of the sub-schedulers, is set to indicate that the associated sub-scheduler is reserved if the first indicator indicates that a corresponding virtual output queue is storing a cell awaiting dispatch arbitration (**claim 11**).

Regarding claim 14, Oki et al. discloses for each of the sub-schedulers, maintaining second indicator for each of virtual output queues, for indicating whether the sub-scheduler is available reserved, wherein the second indicator, for each of the sub-schedulers, set indicate that the associated sub-scheduler is available the associated

sub-scheduler matches cell buffered a virtual output queue with its corresponding output port (**12**).

Regarding claim 15, Oki et al. discloses for each of the sub-schedulers, maintaining a second indicator for each of the virtual output queues, for indicating whether the sub-scheduler is available or reserved, wherein the second indicator is set to indicate that  $p^{\text{th}}$  sub-scheduler is reserved if the first indicator indicates that a corresponding virtual output queue is storing a cell awaiting dispatch arbitration, wherein  $p$  is set to the current cell time slot modulo the third number (**claim 13**).

Regarding claim 16, Oki et al. discloses plurality of central modules, each including outgoing links towards output modules, the output modules collectively including a first number,  $k \times n$ , output ports; second number of input modules, each including groups of  $n$  virtual output queues, and outgoing links coupled with each of the plurality of central modules; a dispatch scheduler comprising: third number of sub-schedulers; and first indicator, associated with each of the virtual output queues, for indicating whether the virtual output queue is storing a cell awaiting dispatch arbitration, wherein each sub-schedulers is adapted to has been reserved, match a virtual output queue with its corresponding output port, and wherein each of the sub-schedulers requires more than one cell time slot to generate a match from its matching operation, and wherein the sub-schedulers can collectively generate a match result in each cell time slot (**claim 14**).

Chao et al. discloses master arbiters, each of the master arbiters being associated with one of the outgoing links of the input module, for selecting a group of

virtual output queues from among those associated with a received request, groups of slave arbiters, each group of slave arbiters being associated with one of the  $k$  groups of  $n$  virtual output queues, for selecting a virtual output queue from among those submitting a request, and virtual output queue arbiters, each virtual output queue arbiter being associated with one of the virtual output queues, for selecting an outgoing link of the input module from among those submitting a grant (**claim 16**).

Regarding claim 17, Oki et al. discloses wherein each of the sub-schedulers require no more than the third number of cell time slots to generate a match result from its matching operation (**16**).

Regarding claim 18, Oki et al. discloses wherein cell buffered a virtual output queue has been successfully matched with corresponding output the virtual output queue so informed (**claim 17**).

Regarding claim 19, Oki et al. discloses wherein if buffered at a virtual output queue has been successfully matched with its corresponding output port, its head of line cell is dispatched (**claim 18**).

Regarding claim 20, Oki et al. discloses wherein the first indicator, for each of the virtual output queues, indicating whether the virtual output queue is storing a cell awaiting dispatch arbitration, is a count, and wherein the count is incremented upon learning that a new cell has arrived at the virtual output queue (**claim 19**).

Regarding claim 21, Oki et al. discloses wherein the count is decremented when an available sub-scheduler is reserved for considering a head of line cell at a corresponding virtual output queue (**claim 20**).

Regarding claim 22, Oki et al. discloses second indicator for each of the virtual output queues and for each of the sub-schedulers, indicating whether the sub-scheduler is available or reserved, wherein the second indicator, for each of the sub-schedulers, is set to indicate that the associated sub-scheduler is reserved if the first indicator indicates that corresponding virtual output queue is storing a cell awaiting dispatch arbitration (**claim 21**).

Regarding claim 23, Oki et al. discloses a second indicator for each of the virtual output queues and for each of the sub-schedulers, indicating whether the sub-scheduler is available or reserved, wherein the second indicator, for each of the sub-schedulers, is set to indicate that the associated sub-scheduler is available if the associated sub-scheduler matches a cell buffered at a virtual output queue with its corresponding output port (**claim 22**).

Regarding claim 24, Oki et al. discloses a second indicator for each of the virtual output queues and for each of the sub-schedulers, indicating whether the sub-scheduler is available or reserved, wherein the second indicator is set to indicate that a  $p^{\text{th}}$  sub-scheduler is reserved if the first indicator indicates that a corresponding virtual output queue is storing a cell awaiting dispatch, and wherein  $p$  is set to the current cell time slot modulo the third number (**claim 23**).

Regarding claim 25, Chao et al. discloses means for sending, on behalf of each non-empty virtual output queue, a request to slave arbiters, each of the slave arbiters being associated with one of the outgoing links of the input module, and each of the slave arbiters being associated with one of the groups of virtual output queues; and

means for sending, on behalf of each of the groups of virtual output queues to which a non-empty virtual output queue belongs, a request to master arbiters, each of the master arbiters being associated with one of the outgoing links of the input module (**claim 17**).

Regarding claim 26, Chao et al. discloses wherein each of the master arbiters operates in accordance with a round robin discipline (**claim 19**).

Regarding claim 27, Chao et al. discloses wherein each of the master arbiters operates independent the others (**claim 20**).

Regarding claim 28, Chao et al. discloses wherein each of the slave arbiters operates in accordance with a round robin discipline (**claim 21**).

Regarding claim 29, Chao et al. discloses wherein each of the slave arbiters operates independent of the others (**claim 22**).

Regarding claim 30, Chao et al. discloses wherein each the virtual output queue arbiters operates in accordance with a round robin discipline accordance (**claim 23**).

Regarding claim 31, Chao et al. discloses wherein each of the virtual output queue arbiters operates independent of the others (**claim 24**).

Regarding claim 33, Chao et al. discloses means for sending a request for the outgoing link of the input module to an arbiter for each of the outgoing links of the central modules that leads towards an output port associated with the virtual output queue matched with the outgoing link of the input module; and for each of the outgoing links of the central module, an arbiter for selecting an outgoing link of the input module from among those that sent a request (**claim 26**).

**Regarding claim 34**, Chao et al. discloses wherein there are: input modules, each having n input ports, k groups of n virtual output queues, and m outgoing links **(claim 27)**.

This is a provisional obviousness-type double patenting rejection.

***Allowable Subject Matter***

2. Claims 6, 11-12, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a) Kamiya et al. (US 2002/0039364), Two-Dimensional Pipelined Scheduling Technique
- b) Moriwaki et al. (US 2002/0057712), Packet Switching Apparatus
- c) Shah et al. (US 2002/0131412), Switch Fabric with Efficient Spatial Multicast
- d) Nong (US 2003/0123468), Apparatus for Switching Data in High-Speed Networks and Method of Operation
- e) Wynne et al. (US 2003/0016686), Traffic Manager for Network Switch Port

Art Unit: 2663

f) Magill et al. (US 2004/0081184), Apparatus and Method to Switch Packets

Using a Switch Fabric with Memory

g) Han et al. (US 2004/0120321), Input Buffered Switches Using Pipelined

Simple Matching and Method Thereof

h) Jun et al. (US 2005/0152352), Scalable Crossbar Matrix Switching

Apparatus and Distributed Scheduling Method Thereof

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Feben M. Haile whose telephone number is (571) 272-3072. The examiner can normally be reached on 6:00am - 3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*fl* 08/02/2005

*Ricky Ngo*  
RICKY NGO  
PRIMARY EXAMINER

8/5/05